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IN THE

Supreme Court of the United States

October Term, 1970

No. 710

ESCAMBIA CHEMICAL CORPORATION,

Petitioner,

versus

STAMICARBON, N. V.,

Respondent.

PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT

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STAMICARBON, N. V.,

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PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT

Petitioner, Escambia Chemical Corporation, prays that a Writ of Certiorari issue to review so much of the judgment of the Court of Appeals for the Fifth Circuit in the above-entitled case as adjudges valid U. S. patent No. 2,727,069 (the "van Waes patent") issued December 13, 1955, entered in the above-entitled case on July 21, 1970.

Citations to Opinions Below

The opinion of the Court of Appeals is reported at 166 USPQ 362 and is reprinted in the Appendix hereto at pages 18a-37a.* The Order of the District Court appealed from

* Page numbers followed by lower case letter "a" refer to the pages of the Appendix to this Petition for Certiorari.

is unreported but is reprinted in full at page 1a. The Findings of Fact and Conclusions of Law of the District Court are reported at 300 F. Supp. 1209 and are reprinted at pages 2a-17a.

Jurisdiction

The judgment of the Court of Appeals was entered on July 21, 1970 (38a-39a). This Court's jurisdiction is invoked pursuant to 28 U.S.C. §1254(1).

Questions Presented

This petition presents issues which are significant with respect to the application of the patent laws and the admissibility of documentary evidence in the trial of patent cases. The questions are stated as follows:

First Question

In applying the statutory test of obviousness to the subject matter of the patent in suit is a proper indication of obviousness the fact that it would have been obvious to *try* said subject matter?

Second Question

Are all publications in the trial of patent cases self-proving, i.e., do not require any foundation whatsoever to be generally admissible as substantive evidence so they can be used for all purposes including the impeachment and contradiction of witnesses.

Statutory Provisions Involved

United States Code, Title 35:

"§102. Conditions for patentability; novelty and loss of right to patent

A person shall be entitled to a patent unless—

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

(c) he has abandoned the invention, or

(d) the invention was first patented or caused to be patented by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application filed more than twelve months before the filing of the application in the United States, or

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or

(f) he did not himself invent the subject matter sought to be patented, or

(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and

reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other."

"§103. Conditions for patentability; non-obvious subject matter

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made."

Statement of the Case

The action below is for infringement of U. S. patent No. 2,727,069. Jurisdiction is based upon 28 U.S.C. 1338(a). In an unusual order (1a) the District Court held the patent valid and Petitioner liable for infringement.

The patent in suit relates to a method for controlling corrosion in a stainless steel reactor used in a very old process for making urea.* Urea is made from ammonia

*Claim 1 is as follows:

"1. In the synthesis of urea wherein gaseous NH_3 and CO_2 are reacted in a form substantially free of sulphur and sulphur-compounds using relatively high temperatures and pressures and apparatus having chromium-nickel steel surfaces exposed to the reactants and reaction conditions, and wherein a normally corrosive carbamate melt is obtained as an intermediate product, the improvement whereby the corrosive effect of said melt is minimized, said improvement comprising effecting said synthesis in the presence of from 0.1 to 3%, by volume, of oxygen based on the amount of CO_2 utilized and using for the chromium-nickel steel surface, chromium-nickel steel containing at least 16% chromium and at least 8% nickel."

and carbon dioxide. It was the first organic material to be synthesized. The asserted improvement covered by the patent is a process making use of well-known stainless steel (the chromium-nickel variety—commonly known as 316 stainless) and adding .1 to 3% of oxygen by volume based upon the amount of carbon dioxide utilized to passivate* the stainless steel and minimize corrosion.** It was well-known that stainless steel would become passivated in an oxidizing atmosphere and protect itself from a corrosive environment and equally well-known that it would corrode in a reducing atmosphere.

The prior urea processes made use of reactors that were lined with lead or silver. It was well-known that stainless steel would become passivated in an oxidizing atmosphere and protect itself from a corrosive environment and equally well-known that it would corrode in a reducing atmosphere.

The prior urea processes made use of reactors that were lined with lead or silver. It was well-known that lead and silver required a reducing atmosphere to minimize corrosion, therefore the oxygen was removed from the ammonia and carbon dioxide.

In the section of its opinion dealing with obviousness the Court of Appeals acknowledges that it was known prior to the patent in suit to use oxygen to passivate stainless steel but not in the particular context of urea manufacture

* "Passivate" means to form a protective oxide layer on the stainless steel just as an aluminum pot forms a protective oxide layer.

** Claim 1 is a European or Jepson type claim where the entire preamble to the words "said improvement comprising" is acknowledged to be old and the language following describes the asserted invention. Ellis, *Patent Claims* pp. 18-19.

(31a). The only reason to passivate steel is to minimize corrosion. The Court of Appeals was apparently unimpressed with this evidence because the Court stated: "the bulk of the evidence tend to show that the use of oxygen in this context came as a surprise to those people skilled in the art" (31a).

It was pointed out to the Court of Appeals that each of the witnesses that was "surprised" did not have knowledge of the well-known "prior art" fact that oxygen or oxidizing agents passivated or caused an anti-corrosion layer to form on stainless steel. See excerpts of prior art reprinted at pages 40a *et seq.* Petitioner contended that it was not specific persons skilled in the operating of urea plants to whom the patent was addressed—these were the persons that were surprised—but the "hypothetical man" skilled in the art including the stainless steel anti-corrosion art to whom the patent was addressed and forms the basis for the determination of the presence or lack of "obviousness" or "invention" under 35 U.S.C. §103.

Petitioner's contention in the lower courts was that a person having knowledge of the prior art wishing to use a stainless steel reactor in a urea process would immediately think to *try* using an oxidizing agent to passivate the stainless steel to minimize corrosion and what could be more obvious to try than oxygen in its cheapest most available form—air!

Petitioner proved in the District Court that engineers including Chemical Construction Company's Rosenbloom*

* Rosenbloom's activities at Chemical Construction Company were proven by his testimony and supported by contemporaneous documents. Chemical Construction Company is the engineering company that built Petitioner's urea plant.

had used oxygen in other chemical processes to minimize corrosion prior to April 15, 1953, the critical date of the patent in suit. Neither the District Court nor the Court of Appeals specifically dealt with this evidence. It is Petitioner's contention that to hold such a patent valid would result in taking away from chemical process engineers one of the working tools of their profession that should be free for all to use, i.e., the use of oxidizing agents to minimize corrosion in stainless steel equipment used in any chemical process including urea manufacture.

It was also pointed out to the Court of Appeals that there was no evidence that the Patent Office in prosecuting the patent application had any knowledge of that most relevant prior art. Petitioner contended that because of this and other art not cited by the Patent Office that the District Court's reliance upon the presumption of validity was misplaced.

At the trial the District Court admitted into evidence certain documents without any foundation or predicate having been laid with respect to such documents. Petitioner objected to the introduction of such documents into evidence on the grounds of hearsay and, in effect, that no proof had been adduced to bring such documents within a recognized exception to the hearsay rule, such as the learned treatise exception. 6 Wigmore *On Evidence* (3rd ed. 1964, supp.) Chpt. LVII, §§1690-1700, pp. 3-41.

The District Court agreed that the seven articles of PX 60 offered at trial, in the absence of the witness they were designed to contradict, were not admissible for such purpose because there was no proper foundation laid for their use as impeachment. However, the District Court also

found that the articles were admissible in connection with the state of the art, and being admissible for that purpose, they could be considered to see if they impeached the absent witness' deposition testimony by contradicting it. The Court of Appeals agreed that the articles were admissible to prove the state of the art but did not agree that there was any need for laying a foundation for the documents in any event because the theory of impeachment was contradiction by extrinsic evidence and not by prior inconsistent statements of the witness (33a-34a).

Thus the Court of Appeals has held that such documents are self-proving documents and that there is no requirement for a party to identify the author, his reputation in the field and the reliability of each publication as a recognized authority in the particular field or to show them to the witness where impeachment by extrinsic evidence is involved. It also held that a patent owner in a patent case has an unlimited dispensation to use any published document he can find to prove a fact when the documents are also offered to prove the state of the art no matter how removed that art may be from the subject matter of the patent in suit.

ARGUMENT

Reasons for Granting Writ

The "Obviousness" Issue

The entire issue of obviousness in this protracted litigation can be reduced to the simple proposition of whether it would have been obvious to try to passivate stainless steel in urea production with the addition of oxygen. The Court of Appeals held that "Even though oxygen was

known as a passivator of stainless steel prior to the date of van Waes' invention, it was not known in the particular context of urea manufacture" and "* * *, we are left with no real basis for holding that the prior art would compel the conclusion that it was obvious to add oxygen to the manufacture of urea to prevent the corrosion of stainless steel" (31a).

This holding is in conflict with the decision of this Court in *Mandel Bros.* v. *Wallace*, 335 U.S. 291 (1948). There, this Court said at page 293:

> "The District Court found that the addition of urea to the older preparations greatly reduced whatever likelihood there had been that application of the preparation would irritate skin or corrode garments. It found that the patentees were the first persons to use urea as a corrosion inhibiting agent in an antiperspirant. But the District Court also found that prior to the patentees' alleged discovery the use of urea as an anticorrosive agent was already a matter of public knowledge, and that it had previously been used as a corrosion inhibitor in compounds other than antiperspirants. As a consequence of these findings, the District Court held the patent invalid."

and at page 296:

> "* * * As we have pointed out, the general store of chemical knowledge in 1938 was such that anyone working on any problem of acidic corrosion and irritation *would naturally and spontaneously have tried urea.* All that these patentees did was to utilize in a cosmetic preparation, publicly available knowledge that urea would inhibit acidic corrosion. The step taken by the patentees in advance of past knowledge was too short to amount to invention. They merely applied an old process of inhibition to a new cosmetic use. This is

not invention. *Dow Chemical Co.* v. *Halliburton Oil Well Cementing Co.*, 324 U.S. 320, 327." (Emphasis added.)

Similarly, it was natural to try oxygen to inhibit corrosion of stainless steel when it was first used in the production of urea in the present case because chemical engineers had made it a general custom to add air to passivate stainless steel in processes for the production of such chemicals as ammonium sulfate and acetic acid. It was the obvious thing to do even though there was no guarantee that it would again be effective in the new context. This principle is recognized by the Court of Customs and Patent Appeals, the arbiter of the standard of invention in the Patent Office. Although the present Court has noted that the standard of invention applied by the Patent Office is notoriously more liberal than the standard that is applied by the courts [*Graham* v. *John Deere Co.*, 383 U.S. 1 (1966)], it would appear that the Court of Appeals for the Fifth Circuit has exceeded the Patent Office in liberality towards patent monopolies in this particular. The rule applied in the Court of Customs and Patent Appeals is expressed in *Application of Ruscetta*, 255 F.2d 687, 692 (CCPA 1958) as follows:

> "It being shown in the British specification that tantalum can be etched for use as an electrode metal by appellants' process it seems to us that it would be most obvious to one skilled in the art, in view of the teaching of Taylor, to apply the same etching process to the other known electrolytic capacitor metals or to alloys of two of those metals.

* * *

> Certainly it would be obvious to try it and mere proof that it worked would not make it patentable over the disclosure of the British specification. 35 U.S.C. §103."

See also, *Application of Moreton*, 288 F.2d 940, 943-4 (CCPA 1961).

If Chemical Construction Company's engineer, Rosenbloom, had been concerned with the construction of a stainless steel urea plant instead of a stainless steel ammonium sulfate plant, it would have been obvious to him to add oxygen to minimize corrosion just as it was obvious to add oxygen in ammonium sulfate production.

The result of the lower court's contrary holding is to improperly restrict the use of a technique for combatting corrosion to stainless steel chemical hardware which has been freely used by chemical engineers such as Mr. Rosenbloom for years prior to the effective date of the van Waes patent. This is diametrically contrary to the purpose of the patent laws because it substracts from, rather than adds to, the useful arts. *A. & P. Tea Co.* v. *Supermarket Corp.*, 340 U.S. 147, 152 (1950); *Graham* v. *John Deere Co.*, *supra*.

This Court should grant the within petition to eliminate the inconsistent application of the patent laws as evidenced by the decision of the court below.

Admissibility of Documents

35 U.S.C. §282 requires the "party asserting invalidity or non-infringement" to notify the adverse party of prior art upon which he will rely.

35 U.S.C. §102 makes prior art patents and publications self-proving after the fact of patenting and publishing the

particular documents has been proven or admitted. Customarily, the fact of patenting or publishing is admitted to avoid unnecessary proofs. These are called prior art documents. They are not admitted to prove the truth of their contents but are treated as *disclosures* to see whether each of them alone or combined disclose or teach the claimed invention or (under §103) make the claimed invention obvious to the hypothetical man skilled in the art.

The lower courts did not differentiate between *this* type of proof and proof offered by the patent owner to support the patentability of the patent in suit which is offered *to prove the truth of its contents.*

Petitioner's position was that in order for such proof to be admitted in evidence (the documents are obviously hearsay as the authors are not present to be cross-examined) for the latter purpose the patent owner must bring the documents under some exception to the hearsay rule by proving an adequate foundation or predicate for their reliability and therefore admissibility.

The usual exception in patent cases is the learned or scientific treatise exception—an authoritative work or author in the field and the witness establishing the foundation can be cross-examined on *voir dire.*

The documents in question are dated from July 22 to October 1959. They were admitted as self-proving documents with no foundation being proven. All of these documents could not have been offered as proof of the prior art because the agreed upon critical date of the patent in suit is April 15, 1953. If all publications remotely relevant

to the subject matter of the patent in suit are admissible *per se* as substantive evidence, the trial of patent cases will become trial by publication in which the words of the most ignorant will have the same force as the words of the most learned with *no* cross-examination of the speakers.

The decision of the Court of Appeals is contrary to the decision of this Court in *Seymour et al.* v. *McCormick*, 60 U.S. 96 (1856) which held that although a prior art document is admissible when offered by the defendant pursuant to the Patent Statute to defeat the patent by showing that the alleged improvement had been described in some public work prior to the supposed discovery thereof by the patentee, it is not evidence of the actual facts contained therein.

The decision of the Court of Appeals is also contrary to decisions in this Court, its own decisions, the decisions of the Florida state courts, the decisions of other Courts of Appeals and the Proposed Rules of Evidence for the United States District Courts (46 F.R.D. 161, 349). *Reilly* v. *Pinkus*, 338 U.S. 269 (1949); *Green* v. *American Tobacco Company*, 391 F. 2d 97 (5 Cir. 1968); *Brown* v. *United States*, 419 F.2d 337 (8 Cir. 1969), *reh. den.* 1970; *City of St. Petersburg* v. *Ferguson*, 193 So. 2d 648 (Fla. App. 1966).

This Court should exercise its supervisory power to keep the trial of patent cases from becoming trials by publication.

CONCLUSION

For the foregoing reasons, this petition for a writ of certiorari should be granted.

Respectfully submitted,

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APPENDIX

Order of the United States District Court

IN THE

UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF FLORIDA

PENSACOLA DIVISION

STAMICARBON, N.V., a corporation,

Plaintiff,

vs.

ESCAMBIA CHEMICAL CORPORATION, a corporation,

Defendant.

ORDER

In accordance with the Findings of Fact and Conclusions of Law entered in the above-styled cause on this date, it is:

ORDERED:

1. The Defendant, Escambia Chemical Corporation is liable to the Plaintiff, Stamicarbon, N.V., for infringement of Plaintiff's valid United States Letters Patent No. 2,727,069.

2. The remaining issues involved in this cause will be determined at a subsequent time to be fixed by the Court.

DONE AND ORDERED at Pensacola, Florida, this 27th day of January, 1969.

WINSTON E. ARNOW
United States District Judge

Findings of Fact, Conclusions of Law and Opinion of the United States District Court

IN THE

UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF FLORIDA
PENSACOLA DIVISION

[SAME TITLE]

FINDINGS OF FACT

1. Plaintiff, STAMICARBON, N.V., is a corporation of the Netherlands, having its principal place of business at Heerlen and Geleen, the Netherlands. It has no offices or place of business in the United States.

2. Defendant, ESCAMBIA CHEMICAL CORPORATION, is a Delaware corporation, having a regular and established place of business at Pace, Florida, and is a subsidiary of the Electric Bond & Share Corporation.

3. Plaintiff charges Defendant with infringement of claims 1 to 3 of patent No. 2,727,069 and Defendant contends that those claims are invalid and not infringed.

4. The general subject of the patent and the art to which it relates is a method for minimizing corrosion of stainless steel equipment in apparatus for manufacturing urea.

5. By agreement between the parties approved by the Court, the trial of this case has been split, with the case initially tried on the issue of liability only. Trial on that issue has now been completed.

Findings of Fact

6. The following facts have been stipulated between the parties, and are agreed statements of facts, requiring no proof of any kind in regard to this case:

A. United States Letters Patent No. 2,727,069 were granted on December 13, 1955, to Joseph P. M. van Waes, who was assignor to Stamicarbon, N.V., Heerlen, Netherlands, the Plaintiff in this suit. These Letters Patent were granted upon an application filed in the United States Patent Office on April 9, 1954, under Serial No. 422,263. The application claimed the benefit of its priority date based upon an application made in the Netherlands, filed April 15, 1953, under the provisions of Title 35, United States Code, Section 119, and under the International Convention for the Protection of Industrial Property (53 Stat. 1748).

B. The Assignment of all rights of Joseph P. M. van Waes in the invention in United States Patent 2,727,069 was made to Stamicarbon, N.V. in a document identified as Plaintiff's Pre-trial Exhibit No. 61, and duly recorded in the United States Patent Office under the provisions of Title 35, United States Code, Section 261.

C. The Defendant Escambia Chemical Corporation owns and operates a plant for the manufacture of urea (NH_2CONH_2), which plant reacts ammonia (NH_3) and carbon dioxide (CO_2) together in order to manufacture such urea.

D. The reaction is conducted in a "reactor" or "autoclave".

E. In the "reactor" or "autoclave", the said ammonia and carbon dioxide reactants are brought together under reaction conditions to form a "urea-

carbamate melt" reaction product. This "melt" has been recognized in literature for years prior to the priority date of the patent in suit as a corrosive chemical material.

F. The internal surfaces of said "reactor" or "autoclave", of Defendant's plant, which are exposed to the reactants, are composed of a chromium-nickel alloy stainless steel, which has the following alloy constituents which fall within the ranges indicated:

Chromium	16-18%
Nickel	10-14%
Molybdenum	2-3%

G. The Defendant Escambia Chemical Corporation also operates its urea plant so that the reaction of the ammonia and CO_2 to form the "melt" is conducted in the presence of an amount of oxygen which falls within the range of 0.1 to 3% by volume of the carbon dioxide used.

H. The Defendant Escambia Chemical Corporation urea plant has an alarm system installed to indicate if the oxygen addition to the carbon dioxide feed stream to the reactor or autoclave is for any reason interrupted.

I. The Defendant's urea plant was designed by and erected pursuant to a contract between the Defendant and Chemical Construction Corporation.

J. The Chemical Construction Corporation never built a urea plant using a reactor having its internal surfaces exposed to the reactants lined with a stainless steel prior to the priority date of the patent in suit.

Findings of Fact

K. Defendant Escambia Chemical Corporation and the Chemical Construction Corporation are both subsidiaries of the Electric Bond & Share Corporation. The defense of this civil action has been openly conducted by the Chemical Construction Corporation, which has agreed to indemnify the Escambia Chemical Corporation against patent infringement with respect to the operation of accused urea plant.

L. Acetic acid has long been known to have a boiling point of 118° C at standard atmospheric pressure.

M. Insofar as the van Waes patent is concerned, the "time the invention was made" under 35 U.S.C. 103 is April 15, 1953.

N. The process used by the Defendant is identical with the claims of process set forth in Claims 1, 2 and 3 of Plaintiff's patent, except that Defendant contends its process is not substantially free of sulphur. The percentage of sulphur found in the process used by the Defendant at the time of the institution of this suit, and until recently, when the Defendant contends it has changed the amount, is within the range 0.1 ppm to 0.2 ppm total sulphur in carbon dioxide, and the total sulphur in the carbon dioxide is from .00001 percent to .00002 percent.

The quantities and percentages of sulphur in Plaintiff's patented process are as follows:

The quantities of sulphur referred to in Plaintiff's patent are 2 mg. of sulphur per m^3 of CO_2 and 5 to 10 mg. per m^3 of CO_2 (page 1, column 2, lines 35, 36).

Findings of Fact

On the basis that 1 mg. per m^3 equals 0.5 ppm, then 2 mg. per m^3 equals 1 ppm, and 5-10 mg. per m^3 equals 2.5-5 ppm.

1 ppm. equals 0.000001, or .0001%

Therefore, 2.5-5 ppm equals .00025%-.0005% and these are the percentages for the corresponding quantities of sulphur given above.

7. Prior to instituting this civil action, Plaintiff had given both the Escambia Chemical Corporation and the Chemical Construction Corporation written notice of the accused infringement, such notice having been originally given in July of 1961.

8. For a number of years prior to date of the invention of the patent in suit, the publicly known and used processes for the manufacture of urea employed reaction vessels or "autoclaves" which were lined with silver or lead metal to avoid the corrosion problem.

9. Silver-lined apparatus is expensive to fabricate and is not generally selected by persons skilled in the art as a preferred material of construction for chemical apparatus unless its use is necessary. Furthermore, the use of silver-lined equipment requires careful purification of the reactants, especially with respect to the removal of oxygen from the carbon dioxide.

10. Lead-lined apparatus is also difficult to fabricate, and maintain, and suffers from the added disadvantage that it cannot be used at the relatively high temperatures at which urea-forming reaction proceeds most efficiently. (e.g., 180-200° C).

11. The invention of the van Waes patent in suit permits the use of apparatus fabricated with stainless steel

liners exposed to the corrosive carbamate melt, while corrosion is controlled by the addition of small amounts of oxygen. Specifically, claim 1 recites the alleged improvement in the synthesis of urea wherein gaseous ammonia (NH_3) and carbon dioxide (CO_2) are reacted in a form substantially free of sulphur and sulphur compounds, using relatively high temperatures and pressure and apparatus having chromium-nickel steel surfaces exposed to the reactants and reaction conditions, and wherein a normally corrosive carbonate melt is obtained as an intermediate product. The alleged improvement comprises (a) effecting the synthesis in the presence of from 0.1 to 3%, by volume, of oxygen based on the amount of CO_2 utilized, and (b) using for the chromium-nickel steel surface a chromium-nickel steel containing at least 16% chromium and at least 8% nickel. Claim 2 further states that the chromium-nickel steel should be austenetic and contain 16 to 20% chromium, 10 to 14% nickel and 1.75 to 4% molybdenum or zirconium. Claim 3 further states that the oxygen should be in the form of molecular oxygen. When the urea-forming reaction is conducted in such apparatus, with oxygen maintained within the stated limits of the patented invention, corrosion of the apparatus is minimized, and may be substantially avoided.

12. The application which issued as the patent in suit was originally filed with a first claim such as that summarized above except that the particular range of oxygen eventually recited was defined simply as "a small amount of oxygen." The patent office rejected this original claim on de Ropp et al. patent No. 2,680,766, which taught the removal of oxygen to below a maximum tolerance of 10 ppm. Since 10 ppm is "a small amount of oxygen" the patent office apparently took the position that this quantitative description of the oxygen content was too imprecise to teach the essential feature of the invention and as writ-

ten was literally anticipated by de Ropp. It was pointed out, therefore, that the "claim must recite" that a significant amount of oxygen is necessary to prevent corrosion. Accordingly, the original claim 1 was modified to teach the addition of from .1 to 3% oxygen by volume based upon the amount of carbon dioxide utilized and the case was allowed, and the patent issued.

13. Plaintiff, Stamicarbon, N.V., has designed, and there have been installed, many urea-manufacturing plants, over the world, based upon and using the process claimed in the van Waes patent in suit; such plants have a total production capacity of well over 6,000,000 tons of urea per year, and this is the most widely used urea process in the world.

14. The evidence is persuasive and establishes that Joseph P. M. van Waes is the first and true inventor of the concept of the addition of a small amount of oxygen to control corrosion in stainless steel equipment utilized in the synthesis of urea, as taught in United States patent 2,727,069.

15. The description of the invention of the patent in suit is set forth in full, clear, concise and exact terms, understandable to persons skilled in the area of urea manufacture, so as to enable them to make and use the same.

16. The evidence is not persuasive that the inventive subject matter defined by the claims of the van Waes patent in suit was publicly known or used or on sale by others in this country prior to April 15, 1953.

17. The inventive subject matter defined by the claims of the van Waes patent in suit was not patented in the United States or any foreign country prior to April 15, 1953.

Findings of Fact

18. The inventive subject matter defined by the claims of the van Waes patent in suit was not described in any printed publication in the United States or in any foreign country prior to April 15, 1953.

19. The inventive subject matter defined by the claims of the van Waes patent in suit was not patented either by the applicant or his legal representatives or assigns in any country prior to April 15, 1953.

20. The inventive subject matter defined by the claims of the van Waes patent in suit was not described to another in any United States patent filed before April 15, 1953.

21. The invention defined by the claims of the van Waes patent in suit was not made in this country by another, who had not abandoned, suppressed or concealed it prior to April 15, 1953.

22. Although it was known in the published literature prior to April of 1953 that oxidizing agents could be employed to control corrosion of stainless steel apparatus used in reducing environments and that certain oxidizing agents had been successfully employed to maintain passivity of the stainless steel apparatus in the synthesis of urea, the use of oxygen as described in the patent in suit cannot be considered obvious in view of the evidence indicating that: (a) Oxygen is a relatively mild oxidizing agent and the synthesis environment is extremely corrosive; (b) the corrosion phenomenon is known to intensify as temperature and pressures are highly elevated; (c) the prior art references teach the removal of oxygen, and characterize its presence as "harmful" and teach the removal of the "oxide film" before using stainless steel in urea apparatus—all in documents which teach the use of other relatively expensive oxidizing agents such as cupric oxide.

Findings of Fact

23. The evidence is not persuasive that Charles Cramer, the Inventa Company, Vulcan-Cincinnati Company (or their predecessors or related companies), or any of them, knew of or were possessed of the inventive subject matter of the claims of the van Waes patent in suit prior to April 15, 1953; it is persuasive that if they, or any one, did have knowledge of such subject matter, it was at all times prior to at least April 15, 1953, maintained as a closely guarded trade secret and as confidential proprietary information undisclosed in any fashion.

24. The evidence is not persuasive that Shigeru Kijima knew of or had conceived of the inventive subject matter defined by the claims of the van Waes patent in suit at any time prior to April 15, 1953; it is persuasive that all such knowledge as he did have with respect to the corrosion of stainless steels by the urea-carbamate melt was maintained "secret", undisclosed to persons outside of his company and its close affiliates, and never made public at any time prior to April 15, 1953.

25. The evidence of work by the witness Kijima does not show that he had been successful in solving the problem of protecting stainless steels having at least 16% chromium and at least 8% nickel in the alloy composition against the corrosive effects of the urea-carbamate melt. In fact, all of Kijima's work with such stainless steels still resulted in corrosion under the reaction and test conditions at an unacceptably high rate.

26. There is no evidence indicating that F. H. Keating ever conceived of or tested the possibility of using a stainless steel-lined reactor or autoclave for the urea synthesis reaction. To the extent that Keating employed oxygen to control corrosion of a stainless steel pipe downstream of

the reactor, in all knowledge made public of such work, there was consciously and deliberately concealed the fact that it related to urea manufacture. The two "communications" by Keating, which are contained in Pre-trial exhibits DC-1 and DC-2, do not reveal any information from which one could clearly or inescapably, or even obviously, conclude that the manufacture of urea was involved in the operations described in such documents.

27. The Defendant's plant for the manufacture of urea involved herein has been operated according to the process conditions set forth and defined in each of claims 1, 2 and 3 of the van Waes patent in suit, the urea being manufactured from ammonia and carbon dioxide so that the surfaces exposed to the corrosive urea-carbamate reaction melt are an alloy of stainless steel comprising from 16-20% chromium, 10-14% nickel and 1.75 to 4% molybdenum in the presence of molecular oxygen in an amount from 0.1 to 3% by volume, based on the amount of carbon dioxide utilized. Such process has been "substantially free of sulphur" within the meaning of that language as used in the van Waes patent.

Conclusions of Law

1. This Court has jurisdiction over the parties and subject matter of this civil action, under 28 U.S.C. 1338 and 1400(b), and 35 U.S.C. 271, and Chapter 29, Sections 281-285.

2. United States Letters Patent No. 2,727,069, was duly and legally issued on May 13, 1955 to Joseph P. M. van Waes as inventor, and to the Plaintiff herein, Stamicarbon, N.V., as assignee and now owner of all right, title and interest in and to said Letters Patent.

Conclusions of Law

3. The aforesaid patent in suit is entitled to the presumption of validity under 35 U.S.C. 282, and the proof offered to overcome this presumption of validity must be such as to prove invalidity beyond a reasonable doubt.

4. The aforesaid patent in suit is entitled to the benefit of the Netherlands priority date of April 15, 1953, under the provisions of 35 U.S.C. 119 and the International Convention for the Protection of Industrial Property (53 Stat. 1748).

5. The "time when the invention was made" as recited at 35 U.S.C. §103 is, under the provisions of 35 U.S.C. §§104 and 119, the 15th day of April, 1953, in this case.

6. The aforesaid patent in suit duly and legally complies with all of the provisions of Title 35, U.S.C., Chapter 11, being properly filed in the name of the first and true inventor, and containing the requisite written description of the invention and the proper claims particularly pointing out and distinctly claiming the subject matter regarded by the inventor as his invention, and otherwise complying with all formal requirements of the patent law in the United States Patent Office.

7. The aforesaid patent in suit was duly and legally issued in compliance with all provisions of Title 35, United States Code Chapter 14, Sections 151-154, and the owners of the patent thereby obtained, under the patent law, "the right to exclude others from making, using or selling the invention throughout the United States."

8. The invention of the patent in suit is for a "process", for the manufacture of urea, and as such is patentable subject matter under the provisions of 35 U.S.C. 100 and 101.

Conclusions of Law

9. Claims 1-3 of the aforesaid patent in suit define subject matter which was novel with respect to all of the "prior art", as the same is defined in 35 U.S.C. 102.

10. The "prior art" which is referred to in 35 U.S.C. 103, and against which the "differences between the subject matter sought to be patented" are to be tested as to whether or not the same were "obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains", is the "prior art" which is defined under the provisions of 35 U.S.C. 102.

11. The evidence does not establish that the novel features of the subject matter defined by the claims of the patent in suit "would have been obvious at the time the invention was made to a person having ordinary skill in the art to which" this invention pertains.

12. Patents and printed publications are not prior art if the effective date thereof is subsequent to the date of invention to which a patent in suit is entitled.

13. The effective date of a domestic patent is its filing date, and the effective date of a foreign patent is its date of issuance, for purposes of establishing whether or not the same are "prior art" under 35 U.S.C. 102 and 103.

14. Evidence to show that an invention was "known or used by others in this country" must include evidence showing that it was "publicly" known or used by others in this country; secret uses which are not publicly known or disclosed do not constitute "prior art" under the provisions of 35 U.S.C. 102 and 103.

15. The distribution of internal and confidential memoranda or correspondence, relating to experimentation or

trade secret and confidential information, does not constitute evidence of a publication, which would make such memoranda or correspondence "prior art" within the meaning of either 35 U.S.C. 102 or 103.

16. An invention, or any part thereof, may be reduced to practice by actual successful testing thereof, or, alternatively, by filing a patent application disclosing features which have never been tested, which filing constitutes a constructive reduction to practice of such non-tested features. The constructive reduction to practice of an invention, or parts thereof—the claimed range of .1 to 3% in this patent—is as effective under the law as actual reduction to practice of the same, to establish the inventor's right to the patent protecting such invention.

17. The .1 to 3% range of oxygen addition taught by the van Waes patent in suit does not affect the validity of the patent whether or not such range is of technological necessity. Such range only represents the sphere of the invention which the patentee has reserved to himself while abandoning the remainder to the public.

18. Evidence of prior efforts, offered to be considered as prior art, available against the patent under 35 U.S.C. 102, must meet the minimum standard of establishing that the prior efforts culminated in a completion of the invention, full reduction to practice and recognition of the nature of the same invention claimed in the patent in suit; no such evidence was here presented.

19. Evidence showing that the concept and nature of the invention was not readily accepted by those most skilled and knowledgeable in the art to which it pertains and was not in fact believed by such persons to work, is evidence of the unobviousness of the invention.

Conclusions of Law

20. Evidence showing that when others who worked on the same problem devised similar or related techniques to solve that problem, they regarded their development as "important", "significant", a "highlight" and something to be kept "secret" as a commercially valuable development, is evidence of the unobviousness of the invention.

21. Evidence of prior work by others resulting in solutions to the problem similar to that devised by the inventor, or of simultaneous work resulting in identical solution, but who kept such solutions secret and concealed from the public is to be received as evidence going only to obviousness or unobviousness of the patent in question, and may be, under particular circumstances, evidence of either.

22. Evidence offered to show a simultaneous solution by persons in foreign countries of the problem which confronted the patentee of the patent in suit is admissible on the question whether such solution "would have been obvious at the time the invention was made to a person having ordinary skill in the art" as recited in 35 U.S.C. §103, even though the inventor is not constructively charged with such foreign knowledge either under 35 U.S.C. §102 or §103.

23. Evidence of simultaneous work by others on solutions to the problem similar to that devised by the inventor of the patent in suit must be clear and convincing if offered as evidence of obviousness under 35 U.S.C. 103.

24. Evidence of simultaneous work by others on solutions to the problem similar to that devised by the inventor of the patent in suit may be indicative, but is not decisive, of unobviousness.

25. Consideration of the standard of invention specified in 35 U.S.C. 103, properly includes consideration of the

length of time the art, though needing the invention, operated without it, evidence of others who sought to supply the need recognized in the art, but failed to do so by the means of the invention of the patented suit, and the extent to which the invention of the patent in suit has been recognized in the industry, and replaced what had previously been available. The evidence bearing on these factors individually and collectively constitute evidence bearing on the question of obviousness of the invention, and, in the case of doubt as to such obviousness, such evidence may be relied upon as determinative in favor of the validity of the patent.

26. The invention described and claimed in claims 1 to 3 of United States Letters Patent No. 2,727,069 is new, useful, novel under the provisions of 35 U.S.C. 102, and was not "obvious" within the meaning of 35 U.S.C. 103.

27. A process is not "on sale" within the meaning of 35 U.S.C. 102(b) when a party or parties, other than the inventor of the patent in suit covering the process or someone deriving title to the patent from him, seek to sell or offer to sell the process without divulging to the public essential features of the process as claimed in the patent in suit, and in fact while maintaining such essential features secret and confidential.

28. The "person having ordinary skill in the art" as recited at 35 U.S.C. 103 is, in this case, an ordinary industrial chemist who has familiarity with the technology of urea production and, by virtue of his training or experience, general knowledge of the principles involved in corrosion control in various chemical processes, as of April 15, 1953.

29. The proof and evidence offered established that the patent in suit has been infringed by Defendant, and is

insufficient to overcome the presumption of validity of the patent to which it is entitled under 35 U.S.C. 282. The defenses of "obviousness", "on sale" and lack of invention presented by Defendant are not sustained by the evidence.

30. Claims 1, 2 and 3 of the Plaintiff's patent in suit United States Letters Patent No. 2,727,069 are valid and have been infringed by the Defendant.

31. Order determining Defendant to be liable to Plaintiff for infringement of its valid patent and directing determination of remaining issues at a later time to be fixed by the court should and will be entered.

* * *

The Findings of Fact and Conclusions of Law contained herein are adopted by this Court pursuant to Rule 52 of the Federal Rules of Civil Procedure. To the extent that Findings of Fact may also be considered Conclusions of Law or Conclusions of Law considered Findings of Fact, they are hereby adopted as such, notwithstanding sectional labeling to the contrary.

DATED this 27th day of January, 1969.

Winston E. Arnow
United States District Judge

Opinion of the United States Court of Appeals for the Fifth Circuit

IN THE

UNITED STATES COURT OF APPEALS

FOR THE FIFTH CIRCUIT

No. 27596

STAMICARBON, N. V.,

Plaintiff-Appellee,

versus

ESCAMBIA CHEMICAL CORPORATION,

Defendant-Appellant.

Appeal from the United States District Court for the Northern District of Florida

(July 21, 1970)

Before GEWIN, GODBOLD and CLARK, Circuit Judges.

CLARK, Circuit Judge: Stamicarbon brought suit for patent infringement and an accounting against Escambia. Escambia defended by attacking the validity of the patent on the bases of obviousness and anticipation. After a lengthy and extensive trial to the court, the district judge found the patent both valid and infringed and reserved decision on the matter of an accounting. Escambia appeals, contending (1) the district court applied an incorrect standard of proof, (2) the court's findings are clearly erroneous,

(3) one of its witnesses was improperly impeached; and (4) the appeal should be dismissed because it appealed from an order which is not appealable. Finding no reversible error in the findings and conclusions of the district court, we affirm.

I. Background[1]

Although the date of the patent in suit is April 15, 1953, the story of this case begins almost twenty years before—in the mid-thirties when a young engineer, Joseph P. M. van Waes, developed a process for manufacturing urea in stainless steel containers which, for all practical purposes, solved the attendant problem of corrosion which had previously plagued the use of such otherwise most desirable equipment. The chief ingredient of the van Waes process was oxygen. When a measured amount of oxygen was introduced in the equipment in which urea was manufactured, it reacted with the stainless steel containers to form a protective film of oxide on the container walls, thus preventing—or very substantially retarding—corrosion. Because of the intervention of World War II and for various other reasons, the van Waes process was not immediately exploited. In fact, it remained unused until about 1948 when Compagnie Nerlandaise de L'Asote (CNA) sold the pilot plant developed by van Waes to the Dutch State Mines (DSM), the parent of Stamicarbon. The urea manufacturing plant was reassembled, and van Waes, who was then working for DSM, was called upon for advice and assistance in making the plant operational and in bringing stainless equipment corrosion under practical control. Finally, in 1953 it occurred to someone that van Waes' process might be patentable. Consequently an application for a patent was filed in The Netherlands on April 15,

1. For the detailed findings of fact and conclusions of law made by the district court, *see* 300 F.Supp. 1209 (N.D.Fla. 1969).

1953. The United States application was filed April 9, 1954, and the subject Letters Patent No. 2,727,069 were granted van Waes on December 13, 1955. Van Waes subsequently assigned this patent to Stamicarbon.

The significance of the van Waes process is manifest. Urea was first synthesized in the early 1800's. It was originally used for the production of certain plastics. In recent years demand has multiplied as it has become important in the fertilizer industry and as a component in certain animal feed. The raw materials of urea basically are carbon dioxide and ammonia. During the process of synthesizing urea, a highly corrosive substance, ammonium carbamate is necessarily produced. Before the van Waes process was developed, urea had to be manufactured in corrosion-resistant vessels that were lined with either silver or lead, neither of which provided a satisfactory solution to the corrosion problem. Both forms of lined vessels were economically and structurally unsatisfactory. The van Waes process permitted the use of cheaper and lighter stainless steel.

Escambia's plant, which is the cause of this suit, is located in Pace, Florida, and was constructed and designed by Chemical Construction Company. It went into operation in January 1962. Assuming the validity of the patent, there is no serious question but that the Escambia process as originally constructed and used does in fact infringe.[2]

2. We are aware that in 1968 Escambia modified its process with the intent to take it out of the area claimed by the Stamicarbon patent. Whether the modified process would still infringe has not been determined, although Stamicarbon admits in its brief that if the new process functions as Escambia claims, there would be no infringement. In any event, that issue is not now before this court. We mention it here only because this opinion is not to be construed as having ruled on this matter.

II. The Erroneous Standard of Proof.

The first ground for reversal advanced by Escambia is that the district court applied an erroneous standard of proof in making its findings in the instant case. Here the attack principally centers upon Conclusion 3, which reads:

> "The aforesaid patent in suit is entitled to the presumption of validity under 35 U.S.C. §282, and the proof offered to overcome this presumption of validity must be such as to prove invalidity beyond a reasonable doubt."

Escambia develops two salients in this assault—(1) the conclusion erroneously imposes a standard of proof "beyond a reasonable doubt", and (2) equally wrongly, it requires proof of invalidity—a question of law to which no standard of proof is appropriate.

We consider first the challenged requirement: "to prove invalidity". In *Graham* v. *John Deere Company*, 383 U.S. 1, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966), the Supreme Court discussed for the first time the enactment of 35 U.S.C.A. §103 (1954) which was added to the patent law in 1952. It ruled that Section 103 codifies the requirement of "invention" imposed by the court in a line of cases beginning with *Hotchkiss* v. *Greenwood*, 11 How. 248, 13 L.Ed. 683 (1851). Section 103 speaks of the concept in terms of "obviousness" rather than "invention". Graham establishes these procedures by which obviousness is determined:

> "Under §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or

non-obviousness of the subject matter is determined. 383 U.S. at 17.

Thus obviousness is a question of law determined against the factual background of the state of the prior art and the claimed improvement on it. *See Anderson's Black Rock, Inc.* v. *Pavement Salvage Co.*, —— U.S. ——, 90 S. Ct. 305, 24 L.Ed.2d 258 (1969); *Johns-Manville Corp.* v. *Cement Asbestos Products Co.*, —— F.2d —— (5th Cir. 1970) [No. 28,659 July , 1970]; *Sucofford* v. *B & W, Inc.*, 395 F.2d 362 (5th Cir. 1968), *cert. denied* 393 U.S. 935, 89 S.Ct. 296, 21 L.Ed.2d 272 (1968); *reh. denied* 393 U.S. 1060, 89 S.Ct. 677, 21 L.Ed.2d 703 (196). Technically read, Conclusion 3 quoted above could be said to set down a standard of proof for a question of law, but this semantic sortie will not carry the point for Escambia. In the first place, numerous cases of this and other courts have loosely spoken in terms of "proving" or "disproving" the validity of a patent. *See e.g. Fairchild* v. *Poe*, 259 F.2d 329 (5th Cir. 1958); *Harman* v. *Scott*, 90 F.Supp. 486 (S.D. Ohio 1950), *aff'd* 195 F.2d 916 (6th Cir. 1952), *cert. denied* 343 U.S. 965, 72 S.Ct. 1059, 96 L.Ed. 1362 (1952); *Grand Union Co.* v. *Kingston Mfg. Co.*, 292 F.Supp. 483 (D.N.H. 1968); *Consolidated Car Heating Co.* v. *Chrome-Gold Alloys Corp.*, 109 F.Supp. 652 (N.D. N.Y. 1952); *Galion Iron Works & Mfg. Co.* v. *Buffalo-Springfield Roller Co.*, 108 F.Supp. 811 (S.D. Ohio 1952). There is another answer. In the broad overall context of its opinion the court's wording here is no more than elliptical. Under the more facile and practical construction to which this conclusion is entitled, the words "the facts which establish" should be understood to come between "prove" and "invalidity." Because what is dealt with is such an integrated question of fact-made law anyway, we cannot say it constituted reversible error for the court to couch its conclusion in terms of proving patent invalidity.

The other prong of Escambia's attack on Conclusion 3 takes aim upon the civil suit stranger—proof "beyond a reasonable doubt." In evaluating the validity of this thrust we need to consider two other conclusions which also refer to the standard of proof. Conclusion 23 states:

> "Evidence of simultaneous work by others on solutions to the problem similar to that devised by the inventor of the patent in suit must be clear and convincing if offered as evidence of obviousness under 35 U.S.C. §103."

And Conclusion 29 states:

> "The proof and evidence offered established that the patent in suit has been infringed by Defendant, and is insufficient to overcome the presumption of validity of the patent to which it is entitled under 35 U.S.C. §282. The defenses of 'obviousness,' 'on sale' and lack of invention presented by Defendant are not sustained by the evidence."

Although Conclusion 3 deals with the presumption of validity in general, whereas Conclusion 23 treats with the narrower issue of an anticipation defense, there seems no reason why a different standard should be applied. *Cf. Metal Arts Co.* v. *Fuller Co.*, 389 F.2d 319 (5th Cir. 1968). We understand the parties to this case to agree that the requisite standard of proof which must be met to overcome the presumption of validity is "clear and convincing evidence."

The courts have not been nearly so unanimous, indeed it may well be said the authorities are in a morass of conflict. We have collected only a few examples from the numerous cases which have dealt with the quantum of proof required to overcome the presumption of validity. But they are sufficient to show that some speak in terms of pre-

ponderance of the evidence, *e.g. Thompson Industries, Inc.* v. *Nippon Thompson Co.*, 298 F.Supp. 466 (E.D. N.Y. 1968); *Application of Lavelle Guild*, 204 F.2d 700 (C.C.P.A. 1954); some use clear and convincing evidence, *e.g. Rooted Hair, Inc.* v. *Ideal Toy Corp.*, 329 F.2d 761 (2d Cir. 1964); *Century Industries, Inc.* v. *Wieboldt Stores, Inc.*, 263 F.2d 934 (7th Cir. 1959), *cert. denied* 359 U.S. 1010, 79 S.Ct. 1149, 3 L.Ed.2d 1036 (1959); *Consolidated Electrodynamics Corp.* v. *Midwestern Instruments, Inc.*, 260 F.2d 811 (10th Cir. 1958); *Pankuil Corp.* v. *Stahlin Bros. Febre Works, Inc.*, 298 F.Supp. 435 (W.D. Mich. 1969); and still others state that the standard is beyond reasonable doubt, *e.g. Fairchild* v. *Poe*, 259 F.2d 329 (5th Cir. 1958); *Hunt Tool Co.* v. *Lawrence*, 242 F.2d 347 (5th Cir. 1957); *Cameron Iron Works* v. *Steholl*, 242 F.2d 17 (5th Cir. 1957); *McCutcheon* v. *The Singer Co.*, 386 F.2d 82 (5th Cir. 1967); *Foster Cathead Co.* v. *Hasha*, 382 F.2d 761 (5th Cir. 1967), *cert. denied* 390 U.S. 906, 88 S.Ct. 819, 19 L.Ed.2d 872 (1947). Mr. Justice Cardozo recognized this confusion in *Radio Corp. of America* v. *Radio Eng'ring Laboratories, Inc.*, 293 U.S. 1, 55 S.Ct. 928, 79 L.Ed. 163 (1934) when he said:

> "A patent regularly issued, and even more obviously a patent issued after a hearing of all the rival claimants, is presumed to be valid until the presumption has been overcome by convincing evidence of error. The force of that presumption has found varying expression in this and other courts. Sometimes it is said that in a suit for infringement, when the defense is a prior invention, 'the burden of proof to make good this defense' is 'upon the party setting it up,' and 'every reasonable doubt should be resolved against him.' * * * Again it is said that 'the presumption of the validity of the patent is such that

> the defense of invention by another must be established by the clearest proof—perhaps beyond reasonable doubt.' * * * The context suggests that in these and like phrases the courts were not defining a standard in terms of scientific accuracy or literal precision, but were offering counsel and suggestion to guide the course of judgment. Through all the verbal variances, however, there runs this common core of thought and truth, that one otherwise an infringer who assails the validity of a patent fair upon its face bears a heavy burden of persuasion, and fails unless his evidence has more than a dubious preponderance. * * * 293 U.S. at 7.

Justice Cardozo thus recognized that in patent cases, at least, there is not such a great trichotomy among these three denominations for the standard of proof in this aspect of a patent case as there may be in other fields of the law.

The Seventh Circuit was confronted with almost the identical issue in *Kraft Foods Co.* v. *Walther Dairy Products*, 234 F.2d 279 (7th Cir. 1956), *cert. denied* 352 U.S. 926, 77 S. Ct. 223, 1 L.Ed.2d 161 (1956), in which they held that a statement such as that found in Conclusion 3 did not require reversal. Part of the language in *Kraft* is particularly apropos:

> "Without a jury as the fact finders, the technical niceties sometimes demanded for instructions are insufficient reasons for annulling a trial judge's ultimate decision. We are unpersuaded that the evidence traced in this record hung in such delicate balance that the concept of proof mentioned by the district judge, even if subjectively held, overwhelmed his evaluation of the facts disclosed by the evidence. 234 F.2d at 283.

After our examination of the record and the findings and conclusions here, we likewise decline to examine this phrase

myopically. The evidence in the instant case did not hang in such a fine balance that the ultimate decision was erroneous because of the reasonable doubt standard articulated by the district judge in Conclusion 3. Had this case been tried to a jury and inconsistent standards been embodied in instructions, *perhaps* a different result would obtain — on that we express no opinion. It is sufficient to say that in the case sub judice we clearly find that the presence of this phrase in Conclusion 3 is not reversible error.

III. Evidentiary Support for the Findings

Since Escambia has failed to persuade us that the court applied an incorrect standard of law in making its findings—a ploy which would have removed those findings from the protection of Rule 52(a) Fed. R. Civ. P. — we must now examine Escambia's second line of battle. In this phase of the engagement, Escambia recognizes that the factual determinations on which the conclusion of patent validity is based are subject — just as any other findings of fact — to the strictures of the clearly erroneous rule. *See Metal Arts Co.* v. *Fuller Co.*, 389 F.2d 319 (5th Cir. 1968); *Micr-Shield Co.* v. *First Nat'l Bank*, 404 F.2d 157 (5th Cir. 1968), *cert. denied*, 394 U.S. 960, 89 S.Ct. 1308, 22 L.Ed. 2d 561 (1968).

This part of the conflict must be reviewed with Escambia's two basic claims of patent invalidity in mind: (1) the invention was on sale in this country more than one year before the date of invention and thus unpatentable for want of novelty, and (2) obviousness. These must be considered together with one efficient counter-consideration — that the patent carries a presumption of validity.

A. The Presumption of Validity.

The district court relied very heavily upon the presumption of validity that attaches to patents under 35

U.S.C.A. §282 (1954): Of course, if it can be shown that the Patent Office was not shown or did not consider additional pertinent prior art, the presumption of validity is weakened if it does not disappear altogether, *e.g. B. F. Goodrich Co.* v. *Rubber Latex Products, Inc.*, 400 F.2d 410 (6th Cir. 1968). In the "prior art book" prepared and introduced by Escambia, there are six patents relied upon: five of the six were cited in the van Waes application, and the sixth was admitted by one of Escambia's witnesses to be not pertinent. Rather than destroying the presumption of validity, it would seem that it is reinforced by the presence of these citations. *Cf. Johns Manville Corp.* v. *Cement Asbestos Products Co., supra*, and *Leach* v. *Rockwood*, 404 F.2d 652 (7th Cir. 1968).

A second inquiry must be made, however, concerning prior art not before the Patent Office, and that deals with articles and other types of documentary material which — if brought to his attention — might have changed the Patent Examiner's mind about the state of the prior art. We have examined these references contained in the Appendix in the prior art book introduced by Escambia. Since such evidence is documentary, we have conducted our examination de hors the clearly erroneous rule. *See e.g. Armour & Co.* v. *Wilson & Co.*, 274 F.2d 143 (7th Cir. 1960). Upon examining the documents in the prior art book, we are not able to say that the district judge erred as a matter of law in Finding of Fact 22 wherein he stated:

> "22. Although it was known in the published literature prior to April of 1953 that oxidizing agents could be employed to control corrosion of stainless steel apparatus used in reducing environments and that certain oxidizing agents had been successfully employed to maintain passivity of the stainless steel apparatus in the synthesis of urea, the use of oxygen as described in the patent in suit cannot be

> considered obvious in view of the evidence indicating that: (a) Oxygen is a relatively mild oxidizing agent and the synthesis environment is extremely corrosive; (b) the corrosion phenomenon is known to intensify as temperature and pressures are highly elevated; (c) the prior art references teach the removal of oxygen, and characterize its presence as "harmful", and teach the removal of the "oxide film" before using stainless steel in urea apparatus — all in documents which teach the use of other relatively expensive oxidizing agents such as cupric oxide."

Finding 22 was principally directed to the defense of obviousness, but the finding made therein of the state of the prior art is equally applicable to support the conclusion that the presumption of validity has not lost its vitality.

In addition, the district court had the advantage — as we do not — of hearing direct testimony which amplified and explained much of the material found in the prior art book. Although we do not base our holding that Finding 22 is correct on this additional testimony, our ruling is certainly reinforced by the presence of such additional evidence.

B. The "On Sale" Defense.

Escambia urges the simple factual defense that Stamicarbon's process — or rather a very similar process (Inventa-Vulcan) — was on sale in the United States more than one year before the date of the patent in suit. 35 U.S.C.A. 102(b) (1954). The relevant Findings of Fact are numbers 16 and 23 and are as follows:

> "16. The evidence is not persuasive that the inventive subject matter defined by the claims of the van Waes patent in suit was publicly known or used or on sale by others in this country prior to April 15, 1953.

> "23. The evidence is not persuasive the Charles Cramer, the Inventa Company, Vulcan-Cincinnati Company (or their predecessors or related companies), or any of them, knew of or were possessed of the inventive subject matter of the claims of the van Waes patent in suit prior to April 15, 1953; it is persuasive that if they, or any one, did have knowledge of such subject matter, it was at all times prior to at least April 15, 1953, maintained as a closely guarded trade secret and as confidential proprietary information undisclosed in any fashion."

These findings while not as specific as they might be are certainly sufficient: they find the ultimate facts—that the process was not known, was not on sale, and was not in public use. The record evidence to support every finding is apparent. Inventa-Vulcan did not actually make a sale of a plant incorporating its process until 1954, and its process was apparently in the experimental stage in 1952 and 1953. There is correspondence in the record indicating that the Inventa-Vulcan process was not functioning in the desired manner in March 1953. Such evidence adequately supports the court's finding. It has long been recognized that:

> "If the thing were embryotic or inchoate; if it rested in speculation or experiment; if the process pursued for its development had failed to reach the point of consummation, it cannot avail to defeat a patent founded upon a discovery or invention which was completed; while in the other case there was only progress, however near that progress may have approximated to the end view. The law requires, not conjecture, but certainty."

Coffin v. *Ogden*, 85 U.S. (18 Wall.) 120, 21 L.Ed. 821 (1874); *see also* 1 Deller's Walker on Patents, §68 (2d ed. 1964) and

cases cited therein. Since there is abundant evidence that the invention relied upon by Escambia as having been on sale did not work, it necessarily follows that the court did not err in holding that no van Waes type process was on sale. Findings 16 and 23 were not clearly erroneous.

C. Obviousness.

We turn now to the more complex issues of obviousness. We have already discussed the process prescribed by the Supreme Court in *Graham* v. *John Deere*, *supra*, whereby the trial court first makes factual determinations as to the state of the prior art, differences between it and the claim at issue, and the level of ordinary skill prevalent in the pertinent art, and then makes a legal determination of obviousness or non-obviousness based upon these factual determinations. The district court in the instant case followed these procedures. For the most part the findings relating to these factual issues are not attacked on this appeal, so no useful purpose would be served by reviewing the evidence which supports each of them. Suffice it to say that the basic factual determinations on which the conclusion of non-obviousness is reached are found in Findings 8-12, 16-22 and Conclusion of Law 28. Of these, only findings 16 and 22 are specifically charged with being clearly erroneous. Both of these findings have been quoted and we have previously examined the evidence supporting them and found them to be well founded. There is, therefore, nothing in the record which undercuts the factual determinations upon which the district court decided obviousness.

Escambia has introduced much evidence to support a conclusion of obviousness, and since obviousness is a much broader concept than lack of novelty, the very evidence which fails to support a lack of novelty defense could support an obviousness defense. Therefore, we are con-

strained to outline and discuss the evidence which Escambia contends would support a conclusion of obviousness.

First, we return to the same articles in the prior art book which we originally examined on the question of novelty. Basically, the processes described in this book teach the use of an oxide of some type while van Waes' patent teaches the use of pure oxygen or air. Even though oxygen was known as a passivator of stainless steel prior to the date of van Waes' invention, it was not known in the particular context of urea manufacture. There is some evidence — though not entirely satisfactory — that oxygen had been used to retard corrosion of stainless steel urea manufacture before 1945 — by others than van Waes — but the bulk of the evidence tend to show that the use of oxygen in this context came as a surprise to those people skilled in the art. When this is joined with the statement in the prior art book that "years of experience in the corrosion field have resulted in the conclusion that practically every corrosion problem should be regarded as a distinct individual," we are left with no real basis for holding that the prior art would compel the conclusion that it was obvious to add oxygen to the manufacture of urea to prevent the corrosion of stainless steel.

Second, Escambia urges evidence of simultaneous solutions of the corrosion problem by others as evidence of obviousness. Most of these so-called simultaneous solutions occurred in other countries. Such evidence would be admissible on the question of obviousness, although it might not be admissible to prove prior art under 35 U.S.C.A. §102 (1954). The district court found that this evidence was not persuasive on the question of obviousness. There are four instances of simultaneous invention discussed in the briefs. The first has already been alluded to—it is the Inventa-Vulcan process. The evidence on this point came in by the deposition of Theodore O. Wentworth and generally

is to the effect that in 1949 a fortuitous discovery was made linking oxygen with corrosion in the urea process. However, as late as 1953 or 1954—as has been shown before—the Inventa-Vulcan process which Wentworth was describing was still being developed and was not perfected. Furthermore, evidence of a fortuitous discovery is not convincing that the solution fortuitously discovered was obvious.

The second "simultaneous invention" comes from Russia. It is a patent which bears the inscription "manifested on May 4, 1954." We do not know and are not told, the meaning of this expression in the Russian patent law, but assuming that it is the date of the issuance of the patent—rather than the date on which the application was filed—it is more than a year after the effective date of the van Waes patent. We do not believe such is evidence that the solution was obvious.

The third is work in England done in the early 1940's. Evidence of this work is based on some articles which deal in very general terms with the reduction or elimination of corrosion in stainless steel vessels by the addition of oxygen. The use of silver vessels in the process is also discussed in the articles. No mention that the process involved is for the manufacture of urea is made in the articles. It is tied to urea by the depositional testimony of an associate of the now deceased scientist who supposedly developed the process. He contends that it should have been obvious to anyone reading the articles that the process involved urea. The difficulty here is, however, that the writer of the articles was attempting to maintain secrecy at the time of his writing. We assume that he did, since we are directed to no evidence showing that anyone picked up his hints at the time of the articles. Although when we have the bright illumination of hindsight, we can see if is obvious that he must have been talking about urea, we cannot say that such would have been obvious to a person possessed of ordinary skill in the art on April 15, 1953.

And finally, the fourth instance of simultaneous invention took place in Japan where, by depositional evidence, it is shown that considerable work was done in 1951 or 1952 —or before—dealing with the use of oxygen to prevent corrosion of stainless steel in the synthesis of urea. It appears, however, that this avenue was not pursued to a final solution, and the scientist working in this area switched to a different metal to be used in an oxygen-free atmosphere. It is an understatement to say that there is no indication of obviousness when the general approach is abandoned and another is then pursued.

We have considered Escambia's other contentions relating to the obviousness issue and find them to be without merit.

IV. Improper Impeachment.

Escambia next mounts a bifurcated assault against the admission of certain articles and documents which, it claims, were used improperly to impeach its witness, Clark. Clark's testimony was presented by deposition. He was cross-examined on certain documents on which he did not rely in his direct testimony. Later at the trial, after Clark's deposition had been admitted, these documents were offered to show the state of the prior art and to impeach the witness. Other documents, about which he was not examined, were also offered for the same purposes. Escambia objected on the ground that no proper foundation for impeachment had been laid and on the additional ground that Stamicarbon was not entitled to prove the prior art.

The district court ruled that the evidence was not admissible for impeachment of the deponent, but was admissible to prove the prior art. Considering the second basis first, we think that Stamicarbon—as an alleged infringee—was clearly entitled to prove the state of the prior art,

and thus the court correctly overruled the objection on that basis. *See Watson* v. *Heil*, 192 F.2d 982 (4th Cir. 1951).

On the first basis, the district court ruled that the evidence offered was not admissible for purposes of impeachment. Escambia, however, points out that the district court, in acting on its objection, said "to the extent that such evidence may impeach the witness' testimony by contradicting it, such exhibit will also be considered" and claims that this language discloses that the court was ruling both ways on the issue of impeachment. Not so.

At the prologue of this analysis it is appropriate to note that the theory of impeachment here was contradiction by extrinsic evidence and not prior inconsistent statements of the witness; so the necessity of laying a foundation is obviated. *See generally* McCormick, *Evidence* §§33, 37 and 47 (1954). We have previously said that "while a party may not attack the credibility of its own witness (e.g. by impeachment), it is free to offer contradictory evidence." *McConville* v. *Florida Towing Corp.*, 321 F.2d 162 (5th Cir. 1963) at 165. If a party may contradict his own witness, it follows *a fortiori* that he may likewise contradict the witnesses of his opponent. The trier of fact then has to choose which evidence is most likely true. To the extent the trier of fact rejects one witness's evidence in favor of another, he holds it is successfully "contradicted" and to this extent it is "impeached". It would be the sheerest sophistry for such an exercise in semantics to result in permitting form to conquer substance.

We hold that the district court did not err in admitting the evidence.

V. APPEALABILITY.

Escambia assumes the extraordinary position—for an appellant—that the order from which it appeals is not appealable. This appeal, of course, is based upon 28 U.S.C.A. §1292(a) (4) (1966), which states in pertinent part that

"the courts of appeals shall have jurisdiction of appeals from: * * * Judgments in civil actions for patent infringement which are final except for accounting. * * *" We have previously said of this provision that "as Professor Moore has pointed out, the pertinent provision 'is applicable only (a) where there is an adjudication that a patent has been infringed, (b) an accounting is ordered, and (c) the adjudication of patent infringement is final except for the accounting'." *Ronel Corp.* v. *Anchor Lock of Florida, Inc.*, 312 F.2d 207 (5th Cir. 1963). The same test of appealability is applicable here.

As we understand Escambia's position, it contends the order is not appealable because the district court did not make findings on some of the matters advanced by Escambia. *Ronel* and *Illinois Tool Works, Inc.* v. *Brunsing*, 378 F.2d 234 (9th Cir. 1967) are cited in support of Escambia's position, but they do not convince us that Escambia's position is sound. In both *Ronel* and *Illinois Tool* counterclaims remained unadjudicated at the time appeal was noticed. In the instant case the district court merely has not made specific findings on every evidentiary contention advanced by Escambia in the course of defending this infringement action. The situations are distinguishable. When a cross-action for infringment or unfair competition has not been disposed of, it is clearly unreasonable to say that the requirement of finality imposed by §1292(a) (4) has been met. On the other hand it is no part of the policy of the statute to require that a district court must make findings on every point raised in evidence before its judgment can be the subject of §1292(a) (4) review. In this class of appeals this court looks to see that the conclusions of law are supported by the findings of fact, and then that the findings of fact are supported by the evidence. It is not properly a part of our inquiry to ascertain if additional findings could be supported or could have been made when those made and found by the trial court adequately and fairly dispose of the material points of fact and law.

Escambia additionally points out, however, that the district court did not act explicitly on Stamicarbon's request for an injunction against further infringement. This lack of action coupled with an erroneous finding—based upon a stipulation—could lead to ambiguities that would becloud the precise holding of the court. It is therefore necessary to examine the context within which the erroneous finding is cast and to determine its effect upon the court's failure to act upon the request for an injunction.

The specific holding is No. 6G, which states:

> "The Defendant Escambia Chemical Corporation also operates its urea plant so that the reaction of the ammonia and CO_2 to form the "melt" is conducted in the presence of an amount of oxygen which falls within the range of 0.1 to 3% by volume of the carbon dioxide used."

This finding is based upon stipulation and very clearly it should have stated:

> "The defendant Escambia Chemical Corporation also operated at all times prior to the pre-trial conference of June 22, 1968, its urea plant so that the reaction of the ammonia and CO_2 to form the "melt" is conducted in the presence of an amount of oxygen which falls within the range of 0.1 to 3% by volume of the carbon dioxide used."

The only evidence upon which Finding 6G is based is the stipulation, and we have no hesitation in acting here to amend the Finding to be consonant with the stipulation. The record shows that the stipulation was amended by the parties after it was first filed. The district judge must have based his findings upon an earlier version. We are convinced that this was a mere oversight or, if not, it was clearly in error. Accordingly we hereby amend this finding to read as it should have read.

The effect of Finding 6G as amended by us is to negate any implication of continuing infringement which could be said to be present in the unamended finding. The sum and substance of the findings as amended are that Escambia operated within the limits of Stamicarbon's patent up to July 22, 1968, but there is no finding as to infringement after that date. Of course Stamicarbon had the burden of proof on the infringement issue, so if it introduced no evidence of infringement after June 22, 1968, the district court could find none. It was in the district court's discretion to grant an injunction against continuing infringement, *see* 35 U.S.C.A. §283 (1954), and Stamicarbon raises no issue that such discretion was abused by the failure to enjoin. We adopt a pragmatic approach to the denial of the requested injunction. This approach has been previously indicated in such cases as *McCoy* v. *Louisiana State Board of Education*, 332 F.2d 915 (5th Cir. 1964); *Board of Public Instruction of Duval County* v. *Braxton*, 326 F.2d 616 (5th Cir. 1964); and *Kelly* v. *Greer*, 354 F.2d 209 (5th Cir. 1965); *accord National Mediation Board* v. *Air Line Pilots Association, International*, 323 F.2d 305 (D.C. Cir. 1963). Through all these cases runs the idea that we must look at what the district court did and measure that against the standard of §1292 to determine appealability. In the absence of a finding of continuing infringement, we therefore assume that the district court had nothing on which to base the grant of an injunction and, sub silentio, denied it.[3] With this assumption, the only issue not disposed of by the district court would be the issue of an accounting. The district court's order is therefore appealable.

AFFIRMED AS MODIFIED and REMANDED for an accounting.

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3. This assumption does not decide the issue of infringement vel non after June 22, 1968. We limit this opinion in this respect to holding that the stipulation made in this case controlled the court's finding, 6G, and that as so controlled we should read the record as denying the injunctive relief requested. Consequently, we refrain from expressing any hint of an opinion concerning the application of the doctrine of res judicata on such issue in any subsequent action.

Judgment of the United States Court of Appeals for the Fifth Circuit

IN THE

UNITED STATES COURT OF APPEALS

FOR THE FIFTH CIRCUIT

October Term, 1969

No. 27596

D.C. Docket No. CA 1559

STAMICARBON, N. V.,

Plaintiff-Appellee,

versus

ESCAMBIA CHEMICAL CORPORATION,

Defendant-Appellant.

Appeal from the United States District Court for the Northern District of Florida

Before GEWIN, GODBOLD and CLARK, Circuit Judges.

JUDGEMENT

This cause came on to be heard on the transcript of the record from the United States District Court for the Northern District of Florida, and was argued by counsel;

Judgment of the United States Court of Appeals

On Consideration Whereof, It is now here ordered and adjudged by this Court that the order of the District Court appealed from, in this cause be, and the same is hereby, affirmed as modified; and that this cause be, and the same is hereby remanded to the said District Court in accordance with the opinion of this Court.

It is further ordered that defendant-appellant pay to plaintiff-appellee, the costs on appeal to be taxed by the Clerk of this Court.

Issued As Mandate: July 21, 1970

Excerpts from DX 5, Entitled "Prior Art Book"

(Tab 8)

"Effects Of Oxygen Exhaustion From Corrosive Solutions On High Nickel-Chromium-Molybdenum Alloy Steels" by W. E. Pratt

[Transactions Of The Electrochemical Society, Vol. 86 (published 1945) pp. 242-3]:

"3. The third case occurred on a plant widely different from those discussed by Mr. Pratt. The equipment consisted of an alloy steel vessel lined on the inside with pure silver. This protection was necessary, since the products of reaction were violently corrosive to steel. The silver protection extended from the reaction vessel, through certain cooling pipes, to a point at which the temperature of the product had fallen to about 100 C. At this temperature it was found that Cr-Ni Austenitic Steel (of the 18/8 type) was adequately resistant without special protection.

The product being manufactured was required to achieve a very high standard of purity. It was found that, in fact, that product from the silver-lined vessel was not satisfactory in that it contained traces of silver which had to be removed at appreciable cost. The silver content of the product was traced to a minute proportion of oxygen in one of the reactants. Steps were taken to reduce this oxygen content to extremely low values and the silver content of the product fell proportionately with the oxygen content of the reactants. At this stage, however, the Cr/Ni Austenitic Steel was violently attacked. This accelerated attack persisted until the oxygen content of the reactants was raised, and thereafter the connection between in-going oxygen, out-coming silver and attack on the austenitic steel was clearly demonstrated by altering, up and down, the quantity of in-going oxygen.

Excerpts from DX 5, Entitled "Prior Art Book"

The problem was, of course, finally solved by injecting oxygen in suitable form into the stream of product after it had left the silver-lined equipment.

W. E. Pratt (*Communicated*): Mr. Keating's remarks and observations certainly encourage us to make more of this type of investigation and publish the results. We are particularly glad to learn of the oxidizing (inhibiting) effect of H_2O_2. Mr. G. C. Crewson mentioned the probable efficiency of some of the per compounds. We had not had time to study their action."

(Tab 9)

"A Brief Discussion of the Metallography of the Stainless Steels and Irons" by Edgar C. Bain (U. S. Steel Quarterly—Winter Number 1930) p. 79:

"The high-chromium bearing alloys now in use are logically divided into two classes: 1. The straight iron-chromium alloys, and 2. The iron-chromium-nickel alloys (a variation contains manganese replacing more or less of the nickel). Both classes exhibit the chromium type of corrosion resistance which, as mentioned before, depends upon oxidizing conditions, but the second class appears to develop a somewhat greater passivity and therefore remains unaffected in a wider variety of environments. The two groups of alloys are, metallographically, quite different. The first type containing generally more than 16 per cent chromium is composed of ferrite, is magnetic and essentially free from transformations and critical points. The second type containing usually 18 per cent chromium and at least 8 per cent nickel, is composed of austenite, normally non-magnetic, but with cold work transforms to the magnetic condition, unless the nickel content is quite high. The two alloy types, it may be seen, correspond to the two crystal varieties of the element iron."

Excerpts from DX 5, Entitled "Prior Art Book"

(Tab 10)

"Metallic Corrosion, Passivity & Protection"—Evans (1946):

"Since the resistance of stainless steels depends on the maintenance of an oxide film in protective form, trifling factors may influence behavior. Seligman describes how a stainless steel was dissolved if abraded and placed in boiling air-free dilute sulphuric acid, whereas, if placed in the cold acid and then brought up to the boil, it was passive; contact with zinc set up attack. Although the amount of oxygen needed to keep the oxide-film in repair is small, it may happen, especially in underground situations, that serious attack on the 13% chromium alloy occurs at strictly anaerobic places; such examples have occasionally been reported from the oil and chemical industries. Keating[5] describes a case where a chemical product had to pass through silver-lined equipment into 18/8 stainless steel vessels. The latter material was unattacked, but there was sufficient action on the silver to contaminate the product. Later, this was successfully overcome by removing all traces of oxygen before the substance entered the silver, but it was then found that the stainless steel was attacked! The problem was finally solved by injecting oxygen into the stream after it had left the silver-lined part of the plant."

(Tab 11)

Republic Enduro Stainless Steels—1951:

"Only with reservations do metallurgists use the word 'stainless' to designate the steels under discussion. Yet the word has become accepted terminology because the public has found that stainless does have desirable corrosion-resistance and certain 'noble' characteristics. To

5. F. H. Keating: Priv. Comm. Dec. 7, 1944. (p. 238)

fulfill the promise of their name, stainless steels require proper handling; and to get maximum resistance to corrosion, the user needs to understand the principles underlying the corrosion-resistance of these alloys. By applying a few precautions which these principles indicate, he can avoid disappointment.

Passivity

Pure iron rusts in aerated water, but if the iron is first dipped in concentrated nitric acid, the rusting is greatly retarded. This effect is called passivity. The passivation phenomenon is believed to have a bearing on the corrosion-resistance of the stainless alloys. Metals of Group VI of the periodic table of elements, (chromium, molybdenum, and tungsten) have the greatest passivity and passivity-conferring properties. Lesser passivity effects are shown by cobalt, nickel, vanadium, tantalum, iridium, and rhodium, which are in neighboring groups of elements. High passivity is conferred upon iron by additions of 11.5 percent or more chromium, the amount depending upon certain factors such as ratio of chromium to carbon.

The passivity produced by these alloying additions is self-generating and stable in the presence of oxidizing agents. No nitric acid treatment is required.

There is as yet no completely proved explanation of passivity, but the theory that an inert self-healing 'oxide film' forms over and protects the metallic surface is useful and well supported. Very thin transparent oxide films have actually been isolated or separated from the surfaces of stainless steels. Moreover, oxidizing agents induce or increase passivity while reducing agents remove the effect of passivation. Alternative theories maintain that a favorable electron redistribution occurs in the inner electron 'shells' as a result of alloying, or that passivity is caused by an insulating layer of absorbed gases. (pp. 177-8)

* * *

Excerpts from DX 5, Entitled "Prior Art Book"

Nitric Acid Cleaning and Passivation of Stainless Steels

"The prime function of the nitric acid passivation treatment is to clean the stainless steel chemically and without harm. Usually the most important service of the treatment is to remove free iron and rust picked up during processing and fabrication. It will also completely or partly remove certain organic materials such as grease, oil, lint and dirt. Paint, lacquer and ink are sometimes taken off with nitric acid. The nitric acid treatment has some importance in regard to reinforcement of the passive film before subjecting to immediate tests or service conditions. However, a properly cleaned stainless steel surface soon becomes passive in clean air and in many other media containing oxygen." (p. 313)

(Tab 13)

"The Corrosion of the Austenitic Stainless Steels", Part I (January 1956):

"It is with the third group of stainless steels that we are concerned, namely, the austenitic ones. Their composition varies from about 16-25% of chromium with, in addition, about 6-22% nickel. Like the ferritic steels, the austenitic group are non-hardenable by heat-treatment, though they will work-harden. They have good working properties and higher strength than the straight chromium steels and are easily fabricated by welding. All these factors, combined with excellent corrosion resistance, have resulted in this class of steel being the most widely used of the stainless steels. (p. 147)

It is unfortunately not possible merely to lay down a list of solutions in which the austenitic stainless steels are passive since in most cases there is a range of concentra-

tions and temperatures over which passivity persists and outside which the metal is active. Moreover, it frequently happens that the solution itself is not the factor which brings about the passivity, but that it is the oxygen dissolved in the solution which is responsible. It is not surprising in such a case that the manifestations of passivity are somewhat irregular. Even in the case of a solution which itself produces passivity and does not rely on the presence of dissolved oxygen, there is not usually a clear line of division between the conditions of concentration and temperature which produce passivity and those which do not. Instead there is a more or less well-defined range of transition between the passivity-producing conditions and those under which the metal is active. Furthermore, passivity is a relative term, and to say that a metal is passive under a given set of conditions does not mean that no attack at all is taking place. In fact, there are very few conditions of exposure under which it can be said that there is a complete absence of attack.

A further point about passivity is that in order for it to be maintained there must be a constant supply of the agent producing it. For example, if passivity of stainless steel is due to the presence of dissolved oxygen in a solution, then if that oxygen is used up or is removed, for example by boiling the solution, passivity will not continue, at any rate for long.

* * *

The composition of the metal will also have a profound influence on the passive range under a given set of exposure conditions. The influence of increasing chromium content is referred to elsewhere, but several other elements which may be present in the austenitic steels also influence the passivity. Nickel is, of course, the most important of these, but the effect of other elements such as molybdenum, which are mentioned elsewhere is also important. The effect of

carbon in contracting the passive range is discussed separately, since the manifestation of activity in this case is confined to the grain boundaries, and the corrosion which takes place is intercrystalline." (p. 149)

(Tab 20)

Nickel Alloy Steels, Second Edition (copyrighted 1949—The International Nickel Company):

"While, in many instances, the desirable physical and mechanical properties of austenitic stainless steels may determine their use, it is generally true that their most important property is their ability to withstand corrosion in most of the environments likely to be encountered by modern materials of construction.

The stainless steels possess an especially useful characteristic in resisting corrosion in that they perform best under those oxidizing conditions which are most harmful to ordinary steel and to many of the non-ferrous metals and alloys.

* * *

The mechanism by which chromium imparts passivity and resistance to oxidizing effects is not fully understood and limitations of space do not permit a discussion of the several theories that have been proposed. Nevertheless, it is evident that whether or not passivity is due simply to the presence of an oxide film (or a layer of oxygen), oxidizing conditions favor the development of passivity and maximum resistance to corrosion. It is also significant that oxygen so readily available from the atmosphere exerts a favorable effect on the performance of stainless steel in most corrosive media and frequently insures practically complete resistance to corrosion." (p. 3)

Excerpts from DX 5, Entitled "Prior Art Book"

(Tab 21)

Handbook on Stainless Steel—Alleghany Ludlum Steel Corporation (copyrighted 1946):

"As is well known, stainless steels resist corrosion by the formation of an oxide film which prevents further attack. Therefore, in order for these alloys to resist corrosion, oxidizing conditions are necessary." (p. 12)

(Tab 25)

Stainless Steels by Carl A. Zapfee—The American Society For Metals—1949:

"Avoiding further theorizing, we shall simply conclude that, with stainless steel, an oxide surface layer conceivably forms which is tenacious and quite impenetrable to migrating atoms—either oxygen atoms pressing inward, or metallic atoms pressing outward—thus passivating the corrosion action; and conversely, when that film is destroyed by certain chemical or mechanical action, the steel 'depassivates' (or 'activates') and becomes liable to attack." (p. 35)

SEP 25 1970
E. ROBERT SEAVER, CLERK

IN THE

Supreme Court of the United States

OCTOBER TERM, 1970

No. 700

ESCAMBIA CHEMICAL CORPORATION, *Petitioner,*

versus

STAMICARBON, N. V., *Respondent.*

BRIEF IN OPPOSITION TO PETITION FOR CERTIORARI

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BRIEF IN OPPOSITION TO PETITION FOR CERTIORARI

INTRODUCTION

This law suit is and was a "fact case." The defendant, Escambia's Petition for a Writ of Certiorari simply expresses Petitioner's displeasure with the adverse determination of *facts,* which were unanimously and *independently* reached by *all* four judges who considered the evidence presented below.

As a result of the application of the ordinary and customary rules of the patent laws to those facts, Petitioner lost both at trial and on appeal.

There are no novel or unusual legal principles involved, nor are any stated in either of the lower Court

Decisions. Petitioner merely again presents to this Court the *same factual arguments* it twice urged below, and which were twice found wholly lacking in merit on the entire evidence in the record.

Thus, no issue or "question" present in this case warrants any consideration or attention by the Supreme Court.

The Petition for Writ of Certiorari should be denied.

NATURE OF THE CASE

This is simply an action for infringement of a U.S. patent, which was duly and properly granted by the Patent Office and sustained as valid by all four judges considering the question below (Judge Arnow in the District Court; Judges Gewin, Godbold, and Clark in the Fifth Circuit Court of Appeals). Though it had argued the issue below, Petitioner no longer denies it has infringed the patent (See Finding 27, Petition, page 11a). Consequently, the patent being valid, Petitioner-Defendant is liable to Respondent-Plaintiff under 35 USC 284, and that is about all there is to it.

Petitioner's Statement of the Case is an inaccurately incomplete presentation of the content of the extensive evidence in this case (involving over 1400 pages of printed Appendix alone). Those inadequacies are believed to be sufficiently revealed within the remainder of this Opposition Brief.

COUNTER ARGUMENT TO PETITIONER'S FIRST QUESTION

Petitioner's First Question assumes, *as a premise*, that it *was* a "fact" that "it would have been obvious to *try*" the invention. If that premise be granted, no one would disagree that such "fact" would be "a

proper indication of obviousness." There is *no* "question" on that issue.

But, the simple answer to *Petitioner's* First Question in *this* case is that *here* the evidence *did not show* it was "obvious to try" the invention of the patent in suit. The Question falls because its premise falls. That this is so can be seen first from—

The Nature of Invention of the Patent in Suit Provided a Deceptively Simple Solution to a Major Chemical Problem

Respondent's van Waes patent in suit, patent No. 2,727,069, defines the inventive discovery of a process which permitted for the first time, in the long history of the art, the utilization of certain particular stainless steel alloys (alloys which possess the necessary machinability and strength characteristics) for construction of urea-manufacturing reaction equipment. In the "extremely corrosive" urea-manufacturing process, the van Waes contribution involves an *apparently* simple step of providing, in the synthesis reaction, a certain small specified amount of oxygen. In the absence of the effect of this oxygen, such a stainless steel reactor would rapidly corrode away in a short period of time (and be destroyed under the explosive force by the internal high pressures employed). When the effect of the added oxygen is *present* according to the patent, corrosion is "minimized" (as the patent claim puts it), to the point that thus-used stainless steel reactors may be successfully employed in the urea manufacturing process for ten, fifteen, or even twenty years. (Cf. Finding 11, Petition pages 6a-7a, and App. 1102).

This was truly an extraordinary discovery and invention, and clearly the proper basis for a valid patent because—

The State of the Prior Art Affirmatively Proved the Unobviousness of the Invention

Prior to the van Waes discovery and invention, that is prior to April 15, 1953,[1] the known operating urea processes utilized a reactor lined either with pure silver metal, or with lead. Both Courts below recognized this was the true state of the art, and that such silver-lined and lead-lined apparatus was "expensive", "not generally selected . . . unless its use is necessary", required "careful purification of the reactants", was "difficult to fabricate", and had the added disadvantage "of being unuseable at the relatively high temperatures at which urea-forming reaction proceeds most efficiently".[2]

There is no persuasive evidence in the case that *anyone*, prior to the van Waes invention, had *ever* successfully used a stainless steel reactor for urea synthesis. However, there *was* extensive evidence of reports in the literature that others had *tried* to use stainless steel reactors for urea manufacture. But in *every* instance those apparent attempts, to solve or avoid the severe corrosion problem, involved the utilization of a corrosion-controlling agent *other than* the addition of oxygen (Cf. DX 5, App. 1290, 1293, 1296, 1301, 1307-8, 1309-11). Such "prior art" anti-corrosion agents, as shown in various documents, ranged from blood albumen to large amounts of poisonous, and expensive, copper metal, all of which also required expensive removal steps to purify the product. (Clark, App. 1055).

Such was the state of the art in April of 1953.

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[1] The "date of invention" for the van Waes patent under the provisions of 35 USC 119, as to which there is no issue in this case.

[2] See Findings by the District Court 8-10, reprinted at Petition page 6a; and the Court of Appeals, reprinted at Petition page 20a.

This was true even though the prior art literature shows reports of research conducted by the United States Bureau of Mines, and other Government agencies, and major chemical corporations, beginning as early as the 1920's, all for the express purpose of finding corrosion-resistant materials suitable for use in the urea-manufacturing process (Cf. PX 42, App. 1454-6; PX 61, Plf. Deposition exhibits 43 through 51, not printed). These same reports show that urea was recognized throughout the 1920's and the 1930's to be a valuable commercial chemical for the manufacture of plastics and fertilizers—*if only* it could be made economically. But *none* taught that the corrosion problem could be solved by simply adding oxygen.

The Petitioner-Defendant, Escambia, completely failed to prove even a single *actual* instance of urea-manufacture in a stainless steel-lined reactor with successful control or minimization of corrosion anywhere in the world at any time prior to the van Waes date of invention.

The only evidence Petitioner offered for that purpose pertained to *the secret operation of a very small urea plant,* at a little town in Switzerland about 1952 (just before the van Waes date of invention).[3] However, while in that plant *some* kind of a stainless steel

[3] Indeed, this evidence involved the *only* unusual legal issue in this case and resulted in a ruling adverse to Respondent and in *Petitioner's* favor. Petitioner relied upon this evidence of a completely concealed, secret use wholly in a foreign country, even though that evidence is completely outside the purview of the "prior art" of 35 USC 103, as defined in 35 U.S.C. 102, especially 102(b). Both Courts below ruled favorably for Petitioner on the admissibility of such evidence, gave it full consideration, but found it wholly unpersuasive *on the merits.*